

## REMARKS

Claims 1, 2, 5-7, 12, and 15-35 are pending.

Independent claims 1, 6 and 15 have been amended to overcome some of the rejections based on 35 USC §112, first and second paragraphs. It is respectfully submitted that these amendments place the application in better form for appeal by materially reducing the issues for appeal. No new matter was added.

For reasons stated herein, the Applicants also submit arguments for overcoming some of the other rejections under 35 USC §112, first and second paragraphs. This should also place the application in better form for appeal by materially reducing the issues for appeal.

Finally, the Applicants also present arguments for overcoming the rejections of the claims under 35 USC §102(b) and §103(a) over the prior art cited by the Examiner. This should eliminate the need for the appeal. Accordingly, a notice of allowance is respectfully requested.

For the Examiner's general information, the format of this amendment corresponds to the "revised amendment format" suggested by the Deputy Commissioner for Patent Examination Policy, Steven Kunin, in an Internet posting on the web site of the U.S. Patent and Trademark Office dated January 31, 2003. According to the revised amendment format, a clean and marked up copy of the amended claims are not required. Rather, a complete listing of all the claims is required with "status identifiers" for all claims and markings (strikethrough and underlining) for currently amended claims.

### I. 35 USC §112, First Paragraph, Rejections

In the Office Action, the Examiner rejected claims 1, 2, 5-7, 12 and 15-35 under 35 USC §112, first paragraph, as containing subject matter which was not described in the

specification in such a way as to reasonably convey to one of skill in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. The phrase “non-platelet-filled” is not discussed in the specification.

The present application, as filed, reads as follows from page 9, line 33, to page 10, line 20:

“With reference to Fig. 3, there is shown a seven layer laminate 31 having an overall thickness of about 275 to 300 microns. This general laminate structure was used for a number of control samples 3-5, and a number of samples 6-13 according to the present invention. The laminate 31 from inside to outside comprises layers 32-38. The inner layer 32 is a layer of LMPDE about 25 to 35 microns thick. The adjacent outer layer 33 is HDPE with a thickness of from 15 to 50 microns which is adhered to a barrier layer 35 by a tie layer 34. The barrier layer 35 is an EVOH layer or an amorphous polyamide layer. The barrier layer 35 is about 10 to 15 microns thick and the tie layer 34 has a thickness of about 5 to 7.5 microns. Externally of the barrier layer 35 is a second tie layer 36, an outer HDPE layer 37 having a thickness of from about 50 to 190 microns, and an external LHPDE layer 38 having a thickness of about 25 to 35 microns.

The thickness in microns of the various layers for each control sample is given in Table 1 below.

The samples 6-13 according to the present invention include layers of polymer filled with 15% ww talc (Magsil Osmonthous) arranged inside of the barrier layer 35. The structure of samples 6-13 are also given in Table 1 below with layer thickness in microns.”

Table 1 of the present application, as filed, indicates with a single asterisk (\*) all the layers that are “15% ww talc filled material” and with an apostrophe (‘) all the layers that are “1% ww talc filled material”. (See Table 1 on page 11.) **The layers that are not marked with a single asterisk (\*) or an apostrophe (‘) contain no filler.** This is clearly the spirit and intent of the present application, as filed. The barrier layer 35 for examples 6-13 are not marked with a single asterisk (\*) or an apostrophe (‘), and thus, are made of EVOH or amorphous polyamide and are non-platelet filled.

In the Office Action, the Examiner admits that the specification on page 11, lines 1-14, indicates that the barrier layer is not 15% by weight talc filled. (Of course, utilizing this

same logic, the barrier layer is also not 1% by weight talc filled. See Table 1.) The Examiner's position is that "no broader language is used which would exclude all platelet fillers."

The Applicants respectfully disagree with the Examiner's position. It is clear from the specification of the present application, as filed, that the layers of the laminate do not include a platelet filler unless specifically identified as containing a platelet filler. For example, Table 1 on page 11 of the present application clearly identifies those layers that include a filler. The filled layers are identified as being either 15% or 1% filled. The other layers identified in Table 1 that are not marked as containing a platelet filler, include no filler.

The examples of the present invention discussed with respect to Table 1 are directed to the use of platelets of talc as a filler. However, it is clear that the same teaching applies equally to the other platelet fillers disclosed by the application. For instance, see page 4, lines 20-21, of the present application which discloses platelet fillers made of clay, mica, graphite and montmorillonite. Thus, while talc is utilized in examples 6-13, it is clear from the application that talc can be replaced with other platelet fillers. However, regardless of the platelet filler utilized, the layers identified as not containing a filler remain non-platelet-filled. This is clearly the intent and spirit of the specification of the present application, as filed.

In summary, the Applicants respectfully submit that the use of the phrase "non-platelet-filled" is subject matter that was fairly described in the specification in such a way as to reasonably convey to one of skill in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. The above discussed Examples (6-13) disclosed in the specification of the present application, as filed, include a number of laminate structures made in accordance to the present invention. The composition of each layer of each laminate structure is precisely disclosed. The barrier layers are

disclosed as consisting of EVOH or an amorphous polyamide. Some layers of the laminate are marked as containing 1% or 15% of filler. The unmarked layers, which include the barrier layers 35, contain no filler.

The phrase “non-platelet filled” was added to claims 1, 6 and 15 in the Applicants’ previous amendment solely to aid the Examiner in understanding the significance of the present invention. The core barrier layer in the claims of the present application is required **to consist essentially of a vapor impermeable non-polyolefin thermoplastic material. The terminology “consisting essentially of” limits the core barrier layer to be made only of the recited vapor impermeable non-polyolefin thermoplastic material and unrecited elements that do not materially affect the basic and novel characteristics of the recited material.** Thus, the core barrier layer as claimed in the present application clearly is made only of the recited vapor impermeable non-polyolefin thermoplastic material and does not include any unrecited elements, such as platelet filler material.

However, in an effort to reduce issues on appeal, Applicants have deleted the phrase “non-platelet-filled” from claims 6 and 15. For these claims, the “consisting essentially of” limitation is relied upon as defining a barrier layer that includes only a vapor impermeable non-polyolefin thermoplastic material without a filler. Thus, removal of the rejection with respect to claims 5-7, 12, 15, 18-26, 28 and 33-35 is respectfully requested.

With respect to claims 1, 2, 16, 17, 27 and 29-32, Applicants submit that the use of the term “non-platelet-filled core barrier layer” is fairly described in the specification in such a way as to reasonably convey to one of skill in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. To this end, one of skill in the art realizes that only the layers specifically identified as including a platelet filler include a platelet filler.

## II. 35 USC §112, Second Paragraph, Rejections

### A. Flavor Molecules

In the Office Action, the Examiner rejected claims 1, 2 and 5 under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. More specifically, the Examiner stated that the phrase “flavor molecules” is indefinite as its meaning is unclear.

Claim 1 has been amended to replace the term “flavor molecules” with the term “flavoring”. No new matter was added. The word “flavoring” is clearly discussed on page 12, lines 3-11, of the present application, as filed. The specifically disclosed “flavorings” include “limonene, cineole, menthone and carvone”.

Removal of the rejection is respectfully requested.

### B. Whereby Clause

In the Office Action, the Examiner rejected claims 1, 2, 5-7, 12 and 15-35 under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. More specifically, the Examiner states that the whereby clause added to claims 1, 6 and 15 defines a result rather than a structural limitation.

The whereby clause was added to claims 1, 6 and 15 in the Applicants’ previous amendment solely to aid the Examiner in understanding the significance of the present invention. The whereby clause was intended to describe a function or operation that necessarily follows from the previously recited structure/method steps. The word “whereby” is typically equated with the phrase “it follows from the foregoing that ...”. Applicants submit that the whereby clause is not indefinite and merely informs that “it follows from the

foregoing that” the placement of the talc-filled layer inward of the barrier layer relative to a flavored good contained by a container made of the laminated material reduces absorption of flavoring of the flavored good into the laminated material and stiffens the laminated material allowing the laminated material to be of a relatively thin thickness. Thus, it is respectfully submitted that this whereby clause merely describes a function or operation that necessarily follows from the previously recited structure/method steps, and therefore, is proper and definite.

However, to reduce issues on appeal, Applicants have deleted the whereby clause from the claims. Removal of the rejection is respectfully requested.

#### C. CIE Whiteness

In the Office Action, the Examiner rejected claims 7 and 15 under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. More specifically, the Examiner states that the phrase “Commission Internationale d’Eclairage (CIE) whiteness index” is indefinite, as it is directed to an international standard and may therefore change with time.

Applicants respectfully disagree that the phrase “Commission Internationale d’Eclairage (CIE) whiteness index” is indefinite. The Commission Internationale d’Eclairage, also known as the International Commission of Illumination, is recognized as an international standardization body and has been a highly respected authority on illumination for over ninety years. The CIE whiteness standard is particularly important and used and relied upon widespread in the paint and paper industries. Attached to this Amendment is a letter from the Secretary General of the International Standard Organization (ISO) to the ISO member bodies in which CIE is recognized as an international standardization body. This,

and other information on CIE, can be located on the CIE website (<http://members.eunet.at/cie/index.html>).

Also enclosed is a Glossary from a UK organization, the Natural Colour System Colour Centre, that utilizes CIE terms as standards. The Glossary states that “CIE is an abbreviation of Commission Internationale d’Eclairage, the international body for colorimetry (measurement of color).” The Glossary also details the relationship between CIE whiteness, blackness and chromaticness.

Applicants respectfully disagree that the CIE whiteness index is subject to change. As stated above, the CIE whiteness index is relied upon to provide constant and predictable standards for the paint and paper industries as well as others. The CIE whiteness index is a specifically defined standard, as detailed in the above referenced glossary, and is relied upon because it provides a constant and predictable standard.

Further, use of the term “CIE whiteness index” has been previously determined acceptable by the U.S. Patent and Trademark Office. For example, a copy of U.S. Patent No. 6,465,064 issued to Branch is enclosed. This patent issued from the U.S. national phase of PCT/GB95/02815 which was cited as publication WO 96/17885 to the Examiner of the present application in a previously filed Information Disclosure Statement. The term “CIE whiteness index” is utilized in the claims of the ‘064 patent.

Thus, for all of the above reasons, Applicants respectfully request reconsideration and removal of the rejection based on the use of the phrase CIE whiteness index. The index is not arbitrary, nor is it subject to change.

### III. 35 USC §102(b) Claim Rejections

In the Office Action, the Examiner rejected all the pending claims, 1, 5-7, 12 and 15-35 under 35 USC §102(b) as being anticipated in view of U.S. Patent No. 4,528,235 issued to Sacks et al.

In the Office Action, the Examiner argues that the Sacks patent discloses a multilayer sheet having three layers of high density polyethylene each having 10-50% of a talc platelet filler. In addition, the Examiner states that each of the layers constitutes a barrier layer.

As discussed in previous responses, the majority of the Sacks patent relates to a thin flexible single layer film utilized as a form-fitting wrap around oxygen-sensitive food products having a short shelf-life. The single layer film includes a platelet filler for purposes of decreasing gas and vapor permeability of the film.

The Sacks patent discloses a film laminate only in column 2, lines 17-43; column 3, lines 49-56; column 6, lines 28-54; and in Examples 25 and 26. More specifically, on column 2, lines 17-43; column 3, lines 49-56; and column 6, lines 28-50; and in Example 25, the Sacks patent discloses a two layer laminate in which **both layers are talc-filled**. On column 6, lines 51-54, the Sacks patent states that the laminate can “have a variety of nonfilled film layers” in addition to the pair of talc-filled layers discussed above. However, column 6, lines 51-54, of the Sacks patent provides **no disclosure of where the “nonfilled film layers” are to be located within the laminate and no disclosure of the material from which the “nonfilled film layers” are made**. The only disclosure of such an embodiment is in Example 26 of the Sacks patent in which a three layer laminate is disclosed having **a talc-filled core layer sandwiched between inner and outer layers of polyethylene that are free of talc (ie., non-talc filled layers)**.



The present invention as claimed in each independent claim, 1, 6 and 15, clearly requires a multilayer laminate that has an outer layer, a non-platelet-filled vapor barrier layer, and a talc-filled inner layer and that can be utilized to form a form-holding container body, such as a tube of toothpaste. The specific location of the talc-filled inner layer is required to be between the barrier layer and a flavored good contained within a container made of the laminate material. This required placement of the talc-filled inner layer relative to the flavored good provides the significant benefit of reducing absorption of flavoring of the flavored good into the laminate material. A reduction of absorption of flavoring is especially important when the good being packaged is a flavored good having a long shelf-life (ie., a three year shelf life).

In the present invention, the claimed method, laminate material and container made therefrom provide improved prevention of the loss of flavoring of flavored good contents of the container because it not only restricts permeability, but also restricts absorption of flavoring from the flavored good into the walls of the laminate. This is accomplished by the placement of the talc-filled polyolefin layer between the non-platelet-filled vapor barrier layer and the flavored goods contained within the container. This claimed placement is crucial to achieve a reduction in the absorption of flavoring molecules into the walls of the laminate material. In addition, the combination of the inward placed talc-filled polyolefin layer with a non-platelet-filled non-polyolefin vapor barrier layer permits the thickness of the non-polyolefin vapor barrier layer to be reduced to less than 25 microns and yet provide the laminate material as a whole with low vapor permeability and with a desired wall stiffness.

There is a clear physical distinction between absorbability and permeability. Sacks measures vapor and oxygen passing through a material in a given time. Thus, Sacks is only concerned with permeability. In addition, the films disclosed by the Sacks patent are intended

for use in wrapping oxygen sensitive food products that have a short shelf-life. In contrast, the present invention measures the amount of flavoring absorbed into a material by observing the weight gain of the laminate material over a given extended time. Thus, the laminate material of the present invention is intended for use with flavored products that have a relatively long shelf-life.

For example, the laminate material of the present invention may be utilized as a toothpaste container for containing flavored toothpaste. The filled and sealed toothpaste container may not be opened for the first time by an end user until three years after the flavored toothpaste was filled and sealed in the container. If absorption of the flavoring is not prevented, the end user will be provided with a toothpaste that is flat and has lost its advertised flavor. Alternatively, if the layers of the laminate material utilized to package the flavored toothpaste is configured as claimed by the claims of the present invention, the toothpaste will still retain the advertised flavoring since the flavoring will be prevented from being absorbed into the walls of the toothpaste container.

The Sacks patent is silent regarding the problem of decreasing absorbability and does not disclose how to restrict absorbability and maintain a low permeability while reducing the thickness of an expensive non-platelet-filled non-polyolefin vapor barrier layer. Further, the cited reference provides no motivation to modify its laminate structures as claimed by the present invention because it provides no teaching with respect to reducing the absorption of flavoring into walls of laminates. The Sacks patent is concerned only with permeability, not absorbability, and does not address nor attempt to solve the problems to which the present invention is concerned.

Claim 1 of the present application requires a method of reducing absorption of flavoring of goods stored in containers into a laminated material of walls of the containers.

The method includes providing a laminate material having a non-platelet-filled core barrier layer sandwiched between an outer layer and at least one further layer. The further layer is required to be formed of a non-polar thermoplastic polyolefin resin filled with a talc platelet filler. The core barrier layer is required to consist essentially of a vapor impermeable non-polyolefin and have a thickness of less than 25 microns. The method also includes storing a flavored good in a container formed from the laminate material such that the further layer of the non-polar thermoplastic polyolefin resin filled with talc extends between the flavored good and the core barrier layer.

Thus, claim 1 requires a non-platelet-filled core barrier layer consisting essentially of a vapor impermeable non-polyolefin (without a platelet filler added) and having a thickness of less than 25 microns. The barrier layer is clearly required not to contain a platelet filler. In addition, the barrier layer consists essentially of a vapor impermeable non-polyolefin and only unrecited elements that do not materially affect the basic and novel characteristics of the recited material. A platelet filler would materially affect the basic and novel characteristics of the barrier layer; thus, the claimed barrier layer cannot be interpreted to include a platelet filler for this additional reason. As discussed above, these limitations are supported by the examples disclosed in the present application, as filed, in which a platelet filler is not utilized unless specifically indicated.

In the Office Action, the Examiner submits that the claim limitation requiring the barrier layer to be non-platelet-filled is not disclosed by the application. Thus, the Examiner interprets the barrier layer as capable of containing a filler. In addition, the Examiner ignores the limitation that the barrier layer consists essentially of a vapor impermeable non-polyolefin which inherently requires the barrier layer to not contain a platelet filler material. This limitation is present in all the claims. Reconsideration of the Examiner's interpretation of the

claims with respect to the barrier layer not containing a platelet filler is respectfully requested for reasons discussed above.

In addition, Claim 1 of the present application requires that the talc-filled layer be located between the barrier layer (without filler) and the flavored good. The Sacks patent fails to disclose the required placement of the talc-filled polyolefin layer relative to the non-platelet-filled barrier layer and a flavored good.

Claim 1 of the present invention further requires the process step of storing a flavored good in a container formed of the laminate material such that the talc-filled non-polar thermoplastic polyolefin resin layer extends between the flavored good and the non-platelet-filled core barrier layer. The Sacks patent fails to disclose such a method step.

Still further, the use of the inward placed talc-filled polyolefin layer in combination with the non-platelet-filled non-polyolefin vapor barrier layer permits the vapor barrier layer to be reduced to less than 25 microns and yet provide the laminate material as a whole with low vapor permeability and a desired stiffness. The significance of reducing the thickness of the non-polyolefin vapor impermeable barrier layer is that this material is extremely expensive in comparison to the other materials utilized in the laminate. Independent claims 1, 6 and 15 all include this limitation. The Sacks patent fails to disclose the claimed combination of an inward placed talc-filled polyolefin layer and a non-platelet-filled non-polyolefin vapor barrier layer that has a thickness of less than 25 microns.

A prior art reference anticipates a claim if the reference discloses expressly or inherently all the elements and limitations of a claim. See Kalman v. Kimberly-Clark, 713 F.2d 760, 771, 218 USPQ 781 (Fed Cir. 1983). Thus, even if one element or limitation is missing, a §102 rejection fails. This requirement is both statutory and absolute as can be seen from the language of 35 USC §103 which states that:

**“A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, ...”**

The Applicants respectfully submit that the Sacks patent does not disclose all the limitations of claim 1 of the present invention as required by an anticipation rejection under 35 USC §102(b). In particular, the Sacks patent fails to disclose a laminate having a non-platelet-filled barrier layer consisting essentially of a vapor impermeable non-polyolefin and having a thickness of less than 25 microns in combination with a talc-filled layer located between the barrier layer (without filler) and the flavored good. In addition, the Sacks patent fails to disclose the process step of storing a flavored good in a container formed of the laminate material such that the talc-filled non-polar thermoplastic polyolefin resin layer extends between the flavored good and the non-platelet-filled core barrier layer.

For the above reasons, the Applicants respectfully submit that independent claim 1 is patentable over, and is not anticipated by, the Sacks patent under 35 USC §102(b).

Independent claim 6 of the present application requires a laminated material for the manufacture of a wall of a container. The laminated material includes an outer layer having a surface that forms an external surface of a wall of a container formed from the laminated material, a barrier layer consisting essentially of a non-polyolefin thermoplastic material having a thickness of less than 25 microns, and at least one further layer that is located on an opposite side of the barrier layer relative to the outer layer. The further layer being made of a non-polar thermoplastic polyolefin resin filled with a platelet talc filler.

Independent claim 15 of the present invention requires a container having a wall formed from a laminated material that has a core barrier layer consisting essentially of a non-polyolefin thermoplastic material, an outer layer having a surface forming an external surface of the container, and at least one further layer arranged on an opposite side of the barrier layer

relative to the outer layer. The one further layer being made of a non-polar thermoplastic polyolefin resin filled with platelets of talc, having a minimum aspect ratio of at least 5 and an average aspect ratio of from 16 to 30, and having a Commission Internationale d'Eclairage (CIE) whiteness of at least 40, and the barrier layer having a thickness of less than 25 microns.

The Applicants respectfully submit that the Sacks patent does not disclose all the limitations of claims 6 and 15 of the present invention as required by an anticipation rejection under 35 USC §102(b). In particular, the Sacks patent fails to disclose a laminate having a barrier layer consisting essentially of a non-polyolefin thermoplastic material (ie., non-platelet-filled) and having a thickness of less than 25 microns in combination with a talc-filled layer located between the barrier layer (without filler) and a flavored good.

Accordingly, reconsideration and removal of all §102(b) rejections is requested.

For these reasons, claims 1, 2, 5-7, 12, and 15-35 are submitted as being patentable over the Sacks patent.


Accordingly, reconsideration and removal of the §102(b) rejection is requested.

## VI. Conclusion

In view of the amendments and remarks, Applicants respectfully submit that the rejections have been overcome and that the present application is in condition for allowance. At the very least, the Examiner is requested to enter this amendment to place the application in better form for appeal by materially reducing the issues for appeal. Thus, a favorable action on the merits is therefore requested.

Please charge any deficiency or credit any overpayment for entering this Amendment  
to our deposit account no. 08-3040.

Respectfully submitted,  
Howson and Howson  
Attorneys for Applicants

By   
William Bak  
Reg. No. 37,277  
Spring House Corporate Center  
Box 457  
Spring House, PA 19477  
(215) 540-9216

**AGREEMENT ON TECHNICAL COOPERATION BETWEEN CIE AND THE  
INTERNATIONAL STANDARDIZATION ORGANISATION (ISO)**

**ISO Central Secretariat**

**our date our reference 1989-07-13 ISO/CIE**

**TO THE ISO MEMBER BODIES AND CORRESPONDENT MEMBERS**

Dear Sirs,

I have pleasure in informing you of the following resolution recently adopted by Council by correspondence:

"Council, deeming that the International Commission on Illumination (CIE) fulfills the prerequisites laid down in 1.1 and 1.2 of Council resolution 19/1984, accepts the International Commission on Illumination as an international standardizing body for the purpose of Council-resolution 19/1984 with a view to CIE documents being processed as ISO International Standards following the procedure set out in Council resolution 19/1984".

Yours faithfully,

Lawrence D. Eicher      Secretary-General

Council resolution 10/1989 in PDF



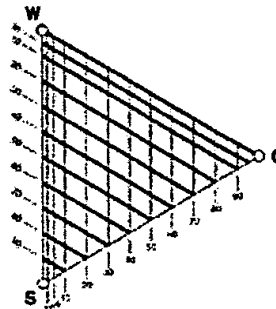
# NCS Glossary

## Explanations of terms relating to the Natural Colour System.

**Delta E** is a numerical value calculated from colour measurements. The value was scaled so that 1 unit approximately should correspond to the largest acceptable colour difference in commercial matters.

**Achromatic** colours - black, white and the greys - are colours that are devoid of any chromaticness.

**Blackness** describes the perceived amount of black in the colour relative to pure black. A colour with the notation S 2060-Y10R has a blackness value of 20. Colours with the same blackness are found along the straight lines parallel to the side W-C on the NCS Colour Triangle.

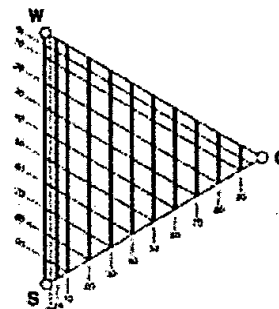


**Blueness** is a colour's resemblance to the elementary colour blue.

**NCS Brilliant** is a high gloss version of the collection of the 1750 NCS colours. NCS Brilliant has a gloss level of approximately 85 units. The normal NCS gloss level is 15-20 units.

**Chromatic** means that a colour corresponds to a hue. The chromatic elementary colours of the NCS System are yellow, red, blue and green.

**Chromaticness** corresponds to the hue and saturation of a colour. The higher the chromaticness the more saturated the colour is. A colour with the notation S2060-Y10R has a chromaticness value of 60. Colours with the same chromaticness can be found along any straight line which is parallel to the side W-S.



**CIE** is an abbreviation of Commission Internationale d'Eclairage, the international body for colorimetry (measurement of colour).

**CIELAB** is a system that is used to define total colour difference by combining three independent variables based on the three opponent pairs of colour vision: white-black, red-green, and yellow-blue.

**CMYK** stands for Cyan, Magenta, Yellow and Black and is the

colour breakdown used for four colour process printing.

**Elementary Colours** of the NCS System are yellow, red, blue, green, white and black. All other colours within the NCS System can be described in terms of these colours.

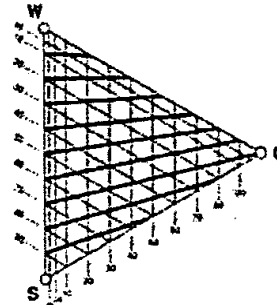
**Gloss Level** is measured according to ISO 2813, 60°. Gloss level instruments illuminate the surface at a 60° angle and measure the reflected fraction of the light. The minimum gloss level is 0 and corresponds to a completely matt surface and the maximum is 100 gloss units corresponding to a very glossy surface.

**Greenness** is a colour's resemblance to the elementary colour green.

**Hue** describes the relative amount of the two nearest chromatic elementary colours that the colour is perceived to contain.

**ISO** is an abbreviation of International Standards Organisation.

**Lightness** of a coloured material can be determined either by instrumental measurement of luminous reflectance factor, or by comparison with samples having known lightness values, e.g. the NCS Lightness Meter, which is a grey scale. Colours with the same lightness are found along the straight lines of the diagram. The positioning of these lines will vary for different hues.

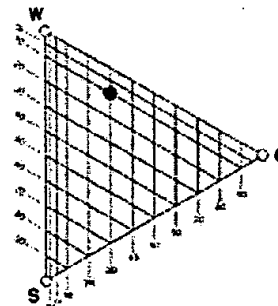


**Luminous Reflectance Factor** is a measure of how much light is reflected from a coloured material. It is given as a percentage where white has a value of 100% and black has a value of 0%.

**Metamerism** is present when two objects look the same colour under one light source, but different under another light source. This is due to the objects reflecting different wavelengths under each light source. This effect often occurs with fabrics.

**NCS** is an abbreviation of Natural Colour System.

**Nuance** describes a colour's relationship to black and to maximum colour intensity or chromaticness. The other element needed to describe a colour would be the hue. Colours that have the same nuance but a different hue will be found in exactly the same location of the NCS Colour Triangle.



**Opponent Colour Theory** formulated by Hering in the late nineteenth century is the model on which the NCS System is

based. Red-green, blue-yellow and black-white are called opponent pairs. This means that a colour can not be perceived as both reddish and greenish at the same time. Colours can however be perceived as reddish-yellow or reddish-blue. The transmission of colour signals to the brain is thought to be conducted according to the opponent colour theory.

**NCS Primary Standard** is a set of unique colour standards for the 1750 NCS colours and is used as reference for production of future standards.



**NCS Quality Centre** is at the Scandinavian Colour Institute, Stockholm, Sweden (head office for NCS). The **NCS Primary Standard** is kept at the NCS Quality Centre. The SCI's certification to **ISO 9002** is based on the checks that are carried out at the NCS Quality Centre.



**NCS Quality Level Standard** is the highest NCS quality level and is designed to be the standard for matching. All NCS Standard Sheets are individually measured. 100% have a deviation **Delta E** less than 0.5 from the **NCS Primary Standard**.



**NCS Quality Level 1** is designed to be used for professional colour specifying material. Items are spot check controlled. 80% have a deviation **Delta E** less than 0.6 and 100% less than 1.0. Most of the NCS products are produced to Quality Level 1.

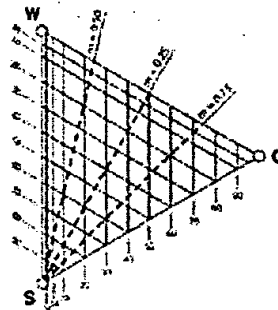


**NCS Quality Level 2** is used for products that are produced in large quantities. Items are spot check controlled. 70% have a deviation **Delta E** less than 0.6, 90% less than 1.0 and 100% less than 1.5. The NCS Index and NCS Selection fans are produced to Quality Level 2.

**Redness** is a colour's resemblance to the **elementary colour red**.

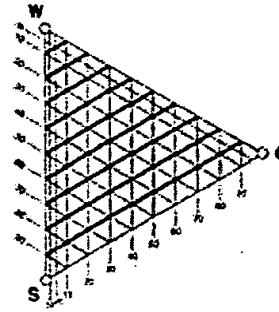
**RGB** is an abbreviation for Red, Green, Blue and is the colour breakdown used for displaying colour on screen.

**Saturation** is the term used to describe the strength of a **hue**, or the purity of a colour. Colours with the same saturation are found along a straight line through the black point (S) on the NCS Colour Triangle.



**SCI** is an abbreviation of Scandinavian Colour Institute. The SCI is based in Stockholm, Sweden and is the head office for NCS.

**Whiteness** =  $100 - (\text{Blackness} + \text{Chromaticness})$ . For example, a colour with the notation S 2060-Y10R has a whiteness value of 20. Whiteness =  $100 - (20 + 60)$ . Colours with the same whiteness are found along any straight line parallel to the side S-C on the NCS Colour Triangle.



**Yellowness** is a colour's resemblance to the elementary colour yellow.

• **Top**

Please [click here to e-mail our webmaster](#) with questions or comments.

Natural Color System® The international language of colour communication.

© Copyright 2003 NCS Colour Centre for the UK and Ireland.